## [EE] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

## [S-CG53]Science of slow earthquakes: Toward unified understandings of whole earthquake process

convener:Satoshi Ide(Department of Earth an Planetary Science, University of Tokyo), Hitoshi Hirose(Research Center for Urban Safety and Security, Kobe University), Kohtaro Ujiie(筑波大学生命環境 系, 共同), Takahiro Hatano(Earthquake Research Institute, University of Tokyo) Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe) Accumulating observational studies on various types of slow deformation events, such as tectonic tremors, very low frequency events, and slow slip events, portrays some universal characteristics in generally complex behavior, including interaction among events and influence by various outer loadings. Some of these phenomena seem to have causal relation with the occurrence of very large earthquakes. A unified understanding of these slow and fast earthquake processes requires an approach integrating geophysics, seismology, geodesy, geology, and non-equilibrium statistical physics. We welcome presentations based on, but not limited to, geophysical observation, data analysis, analytical theory, numerical simulation, field study, and laboratory experiments.

## [SCG53-P10]Spatiotemporal variations of spectral characteristics of deep low-frequency earthquakes in northeastern Japan

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We examined the spatiotemporal variation of peak frequency of deep low-frequency microearthquakes beneath northeastern Japan. The earthquakes are anomalous because they have quite low predominant frequencies than those expected from earthquake magnitude, and they occur well below the cutoffdepths of ordinary inland earthquakes. Thus, the investigation of generation mechanism of lowfrequency earthquakes probably leads to the understanding of large inland earthquakes, however, the mechanism has not yet been clarified.

In this study, to get fundamental knowledge about the waveforms of low-frequency earthquakes, we evaluated the predominant frequency between two horizontal components in S-wave part. We then obtained spatiotemporal plots of station-averaged predominant frequencies for thirteen areas from Hokkaido to northern Kanto district. The peak frequency ranges from 1 to 6 Hz, mostly from 2 to 5 Hz. There is no clear dependence of predominant frequency on earthquake location and on the time of occurrence. However, in some areas, there is weak dependence on location. For example, at Mashu in Hokkaido and the Ani area in Akita prefecture, events with lower predominant frequency seem to occur in a deeper part. On the other hand, at Yoteizan area in Hokkaido, clusters including higher frequency events are located in a deeper location. Thus, the predominant frequency does not directly reflect pressure and temperature in the source area. Rather, the result suggests that the frequency is much affected by additional and minute environmental factors such as composition and stress in the source area.

Our previous study has shown the diversity of waveforms of low-frequency earthquakes by grouping events using a waveform cross-correlation. Using a time window immediately after the arrival of the Swave, it is found that closely located earthquakes tend to form a single group, which suggests a similarity of focal mechanisms among grouped events. However, the value of cross-correlation is much lower than that of ordinary high-frequency events, and many events are not grouped even if the location is near grouped events. The present result of predominant frequency also suggests that focal mechanisms and source processes of low-frequency earthquakes differ from event to event.